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*Comprehensive Guidelines for  
Academic Excellence  
in*

13

**SCIENCE & TECHNOLOGY**

**for  
Class - X**

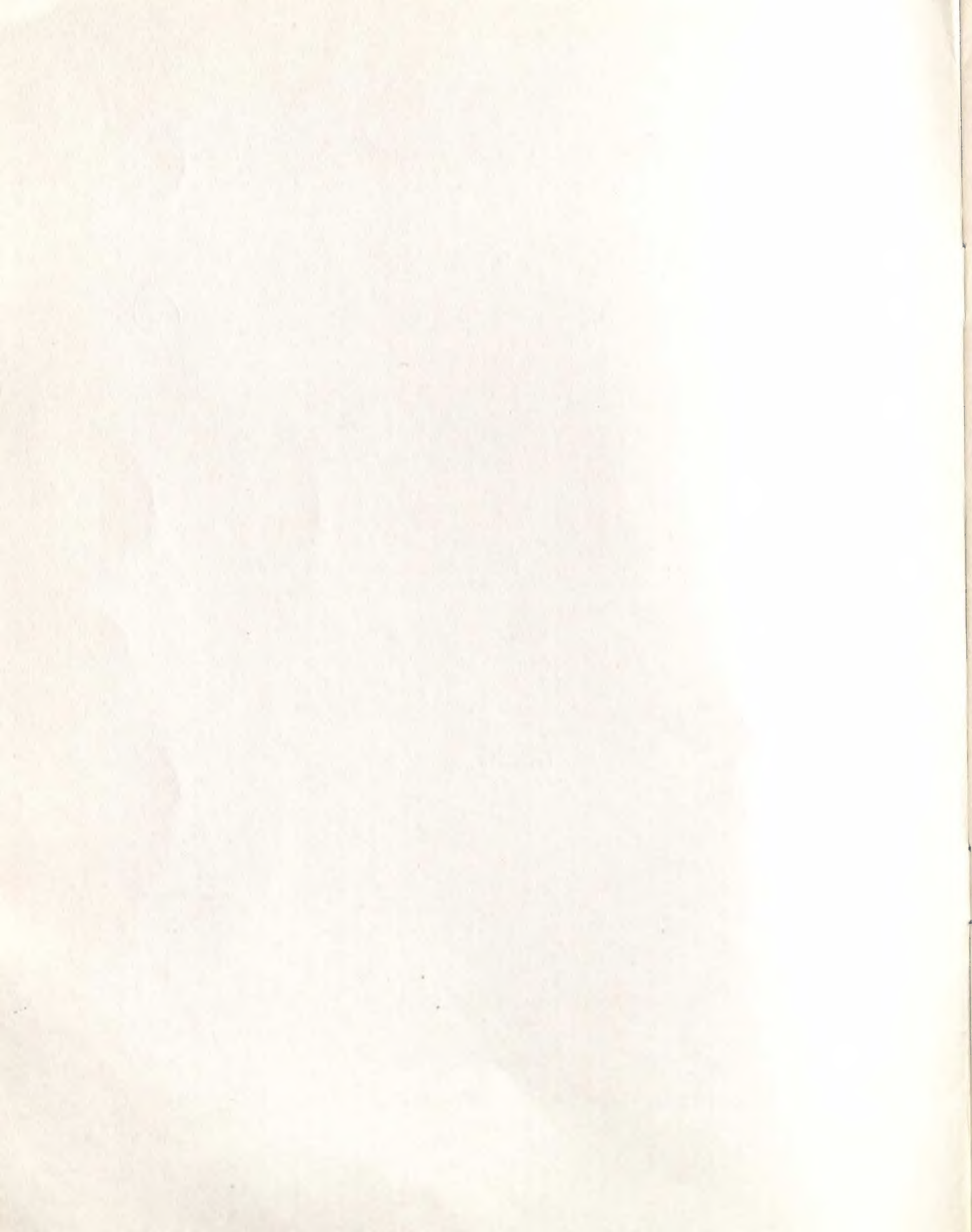


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# *Comprehensive Guidelines for Academic Excellence in*

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# SCIENCE & TECHNOLOGY - Class X

## (Theory)

### PRESENT SITUATION

- ❖ Poor result of science if considered separately in theory and practical.
- ❖ Decline in number of students in science stream at 10 +2 Level.
- ❖ Decreasing scientific attitude and interest in science among students.

### NEED OF THE HOUR

- To improve the result qualitatively in theory.
- To increase the strength of students at 10 +2 level.
- To inculcate scientific temper among students.
- To sensitise students about environment.
- To enhance the value and application of science in daily life.

### *Weightage to content/ subject units*

S.No.	Learning Outcomes	Marks
1.	Chemical Reactions and some important chemical compounds	06
2.	Energy	22
3.	Life Processes	19
4.	Natural Resources	18
5.	Our Environment	05
6.	Exploring Space	05



### *Weightage to forms of questions*

S. No.	Form of Questions	Marks for Each Question	Number of Questions	Total Marks
1.	Long Answer Type (LA)	5	4	20
2.	Short Answer Type (SA-I)	3	11	33
3.	Short Answer Type (SA-II)	2	07	14
4.	Very Short Answer Type (VSA)	1	08	08
	<b>TOTAL</b>		30	75

Note : A weightage of 7 marks has been given to numerical questions.

### *Weightage to Learning Outcomes*

S. No.	Learning Outcomes	Marks	Percentage of Marks
1.	Knowledge	30	40
2.	Understanding	37	50
3.	Application	08	10

### *The Expected time for different types of questions*

S.No.	Form of Questions	Expected time for each question (Minutes)
1.	Long Answer Type (LA)	10-15
2.	Short Answer Type (SA-I)	6 - 8
3.	Short Answer Type (SA-II)	3 - 5
4.	Very Short Answer Type (VSA)	1 - 2



As the total time is calculated on the basis of the number of questions required to be answered and the length of their anticipated answers, it would, therefore, be advised for the candidates to budget their time properly by cutting out the superfluous words and be within the expected time limits.

**SCHEME OF OPTION :**

There will be no overall choice. However, there is an internal choice in few questions as per the following details :

- (a) Long Answer Questions (5 Marks) : In any two questions.
- (b) Short Answer Questions (3 Marks) : In any two questions.
- (c) Short Answer Questions (2 Marks) : In any one question.

**WEIGHTAGE OF DIFFICULTY LEVEL OF QUESTIONS :**

S.No.	Estimated Difficulty Level of Question	Percentage
1.	Easy	15
2.	Average	70
3.	Difficult	15



**Subject : SCIENCE & TECHNOLOGY**

**Paper : Theory**

**Class : X**

**Time : Three Hours**

**Maximum Marks : 75**

**BLUE PRINT**

Objective → Form of Questions → Content Unit ↓	Knowledge				Understanding				Application				Total
	LA	SA I	SA II	VSA	LA	SA I	SA II	VSA	LA	SA I	SA II	VSA	
Chemical Reactions and Some Important Chemical Compounds				1(1)		3 (1)	2 (1)						(6(3))
Energy	5(1)	3(1)	2(1)	1(1)	5(1)			1(1)		3(1)	2(1)		22(8)
Life Processes		6(2)		2(2)	5(1)		2(1)	1(1)		3(1)			19(8)
Natural Resources		3(1)	*	2(2)	5(1)	6(2)	2(1)						18(7)
Our Environment		3(1)					2(1)						5(2)
Exploring Space			2(1)			3(1)							5(2)
Sub Total	5(1)	15(5)	4(2)	6(6)	15(3)	12(4)	8(4)	2(2)		6(2)	2(1)		
Total	30 (14)				37 (13)				8 (3)				75 (30)



### **General Instructions**

1. The question paper comprises of two sections. A and B. Student has to attempt both the sections.
2. The candidates are advised to attempt all the questions of Section A separately and questions of Section B separately.
3. All questions are compulsory.
4. There is no overall choice. However, internal choice has been provided in some questions. You are to attempt only one option in such questions.
5. Marks allocated to every question are indicated against it.
6. Question numbers 1-5 in Section A and 21-23 in Section B are very short answer questions. These are to be answered in one word or one sentence.
7. Question numbers 6-10 in Section A and 24, 25 in Section B are short answer questions. These are to be answered in 30 -40 words each.
8. Questions numbers 11-17 in Section A and 26-29 in Section B are also short answer questions. These are to be answered in 40-50 words each.
9. Question numbers 18-20 in Section A and 30 in Section B are long answer questions. These are to be answered in 70 words each.



**Theme - MATTER****Sub Topic : Chemical Reactions and Some Important Chemical Compounds****Value Points : 6(3)**

Type of Expected Questions	Marking Scheme	Common Mistakes Committed by Students	Points to be Emphasised
1) $P^H$ Scale, numericals VSA - 1 Mark based on $P^H$ , Rate of Chemical Reaction, Dynamic Equilibrium, Factors Effecting Rate of Reactions, Expression of Equilibrium Constant, Type of Reaction.	VSA - 1 Mark (1 Question)	<ul style="list-style-type: none"><li>Do not write S.I. Units</li><li>Do not write proper formula.</li><li>Do not write balance chemical reactions.</li></ul>	<ul style="list-style-type: none"><li>Should write S.I. Units properly.</li><li>Write balance chemical equation.</li><li>Practise numericals based on <math>P^H</math>, rate of a reaction &amp; identification of chemical reaction.</li></ul>
Preparation of Washing Soda, Bleaching Powder, Plaster of Paris, Cement, Properties of Steel like Quenching, Tempering, Annealing, Efflorence, uses of Chemical Compounds.	SA - 2 Marks (1 Question)  SA - 3 Marks (1 Question)	<ul style="list-style-type: none"><li>Do not draw labled diagram properly.</li><li>Do not write answers separately.</li></ul>	<ul style="list-style-type: none"><li>Efflorence, Composition of cement, Uses of glass, uses of optical fibers, uses, properties &amp; preparation of bleaching powder, baking powder, cement, glass.</li></ul>

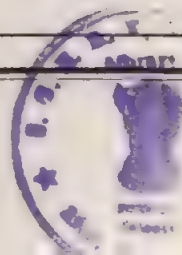


## Theme - ENERGY

**Sub Topic : Reflection of Light, Refraction of Light, Optical Instruments, Electricity & its Effects, Chemical Effects of Current, Magnetic Effects of Current. Source of Energy.**

**Value Points : 22 (8)**

Type of Expected Questions	Marking Scheme	Common Mistakes Committed by Students	Points to be Emphasised
<p>Numerical based upon mirror formula, lens formula, power of lens, refractive index, compound microscope, telescope, Ohm's law, Series and parallel combination of resistance, faraday's law, calorific value of a fuel and solar constant.</p> <p>Total internal reflection of light, defects of eyes and their correctness, ray-diagram of microscope and telescope, ray-diagrams of objects through concave mirror, convex mirror and concave lense and convex lense. Ohm's law, electric generator and electric motor, fractional distillation of petroleum, solar devices, Bio-Gas plants, nuclear reactor plant, liquid drop model theory of nuclear fission, chain reaction, role of projectile, thermo nuclear reactions.</p>	<p>LA - 5 Marks (2 Questions)</p> <p>SA- 2 Marks (2 Question)</p> <p>SA- 3 Marks (2 Question)</p> <p>VSA - 1 Marks (2 Question)</p> <p>Total - 22 Marks (8 Questions)</p>	<ul style="list-style-type: none"> <li>- Do not write S.I. Units</li> <li>- Do not write proper formula</li> <li>- Do not write balance chemical reactions.</li> <li>- Do not draw labled diagram properly.</li> <li>- Do not write answers separately.</li> <li>- Do write relevant answer to the ques-tions.</li> <li>- Do not write Question Number and set of the question paper.</li> <li>- Do not attempt section 'A' and Section 'B' separately.</li> </ul>	<ul style="list-style-type: none"> <li>- Should write S.I. Units properly.</li> <li>- Write balance chemical equation.</li> <li>- Practise numericals based on given topics.</li> <li>- A weightage of 7 marks has been given to numerical questions.</li> <li>- Practise all diagrams given in NCERT Book.</li> <li>- <math>\frac{1}{2}</math> mark is given for writing formula and <math>\frac{1}{2}</math> mark for correct S.I. Unit.</li> <li>- Question should be attempted stepwise.</li> </ul>



**Theme - LIGHT PROCESSES**

**Sub Topic : Nutrition, Respiration, Transportation, Excretion, Control and Coordination, Reproduction, Heredity and Evolution.**

**Value Points : 19(8)**

Type of Expected Questions	Marking Scheme	Common Mistakes Committed by Students	Points to be Emphasised
Mechanism of Photosynthesis and Factors affecting it. Digestive system of grass hopper, human being, difference between aerobic and anaerobic respiration, breathing and respiration, respiration in plants and animals, transpiration and translocation, human heart and its working, mechanism of blood clotting, mechanism of urine formation, structure of human brain, photo hormones and their functions. endocrine glands, reflex action, double fertilization in plants, vegetative propagation, male and female reproductive system, structure of DNA, theories of evolution, evidence of organic evolution, sex determination in man, STD, control methods of population.	<p>LA - 5 Marks (1 Question)</p> <p>SA - 3 Mark (3 Questions)</p> <p>SA - 2 Marks (1 Question)</p> <p>VSA - 1 Mark (3 Questions)</p> <p>Total : 19 Marks (8 Questions)</p>	<ul style="list-style-type: none"> <li>- Do not write S.I. Units</li> <li>- Do not write proper formula.</li> <li>- Do not write balance chemical reactions.</li> <li>- Do not draw labelled diagram properly.</li> <li>- Do not write answers separately.</li> <li>- Do write relevant answer to the questions.</li> <li>- Do not write Question Number and set of the question paper.</li> <li>- Do not attempt section 'A' and Section 'B' separately.</li> <li>- Do not write names of the reactants and products.</li> <li>- Do not write conditions necessary for chemical reactions.</li> <li>- Do not attempt long answer type question as a single unit.</li> </ul>	<ul style="list-style-type: none"> <li>- Practise the main diagram in the NCERT Text Book.</li> <li>- Label the diagram properly as required in the question.</li> <li>- Enough practise should be given in drawing and label the diagram properly.</li> <li>- Diagram should be drawn by pencil.</li> <li>- Diagram should be neat, clean and symmetrical.</li> <li>- Questions should be attempted as a whole.</li> <li>- Should explain the concept with relevant formula and equation.</li> </ul>



**Theme - NATURAL RESOURCES****Sub Topic : Metals and Non-metals, Carbon Compounds****Value Points : 18(7)**

Type of Expected Questions	Marking Scheme	Common Mistakes Committed by Students	Points to be Emphasised
Metallurgy of Iron and Aluminium, alloys their composition, properties and uses.		<ul style="list-style-type: none"><li>- Do not write proper formula.</li><li>- Do not write balance chemical reactions.</li></ul>	<ul style="list-style-type: none"><li>- Practise the main diagram in the NCERT Text Book.</li></ul>
Purification of Copper, manufacturing of Ammonia, Preparation of Sulphuric Acid, frash process, thermite welding, strategic metals, Amphoteric Oxides and Nutral Oxides,	LA - 5 Marks (1 Question)	<ul style="list-style-type: none"><li>- Do not draw labelled diagram properly.</li><li>- Do not write answers separately.</li></ul>	<ul style="list-style-type: none"><li>- Lable the diagram properly as required in the question.</li></ul>
Function Groups - Preparation of Ethanol, Propanone, Ethanoic Acid, Ethanal, reactions of tollen's reagent, fehling reagent, cleansing action of soaps and detergents, polymerisation, addition polymers with their examples and uses.	SA- 3 Marks (3 Question)	<ul style="list-style-type: none"><li>- Do write relevant answer to the questions.</li></ul>	<ul style="list-style-type: none"><li>- Enough practise should be given in drawing and label the diagram properly.</li></ul>
	SA- 2 Marks (1 Question)	<ul style="list-style-type: none"><li>- Do not write Question Number and set of the question paper.</li></ul>	<ul style="list-style-type: none"><li>- Diagram should be drawn by pencil.</li></ul>
	VSA - 1 Mark (2 Questions)	<ul style="list-style-type: none"><li>- Do not attempt section 'A' and Section 'B' separately.</li></ul>	<ul style="list-style-type: none"><li>- Diagram should be neat, clean and symmetrical.</li></ul>
	Total - 18 Marks (7 Questions)	<ul style="list-style-type: none"><li>- Do not write chemical names of the reactants and products.</li></ul>	

**Theme - LIGHT PROCESSES**

**Sub Topic : Nutrition, Respiration, Transportation, Excretion, Control and**

**Value Points : 19(8)**

Type of Expected Questions	Marking Scheme	Common Mistakes Committed by Students	Points to be Emphasised
Bio-degradable and non-bio-degradable waste, occupational hazards, eutrophication, green house effects, sustainable development, preservation and conservation of environment, environmental laws and their need, causes, ill effects and preventive measures of air pollution, water pollution and soil pollution, Sewage treatment.	SA - 3 Marks (1 Question)  SA - 2 Marks (1 Question )  Total : 5 Marks (2 Questions)	<ul style="list-style-type: none"><li>- Do write relevant answer to the questions.</li><li>- Students often intermix causes, ill-effects and preventive measure of air pollution, water pollution and soil pollution.</li></ul>	<ul style="list-style-type: none"><li>- It is a very simple easy chapter related to our environment and can be learnt easily by students.</li><li>- Student must be very clear about causes, ill-effects and preventive measures of the air pollution, water pollution and soil pollution.</li></ul>



**Theme - THE UNIVERSE****Sub Topic : Exploring Space.****Value Points : 05(2)**

Type of Expected Questions	Marking Scheme	Common Mistakes Committed by Students	Points to be Emphasised
Define - Planets, asteroids, comets, meteors and meteorite, internal structure and evolution part, constellations, theories of beginning of universe, type of artificial satellites and their orbits, application artificial satellites, Aims of ISRO and NASA, chromatic features of Terrestrial and Jovian planets, relation between orbital velocity and time period of a satellite, characteristics of a rocket fuel with example, Kepler's laws governing the motion of satellites.	SA - 2 Marks (1 Question)  SA - 3 Marks (1 Question )  Total : 5 Marks (2 Questions)	<ul style="list-style-type: none"><li>- Do not write S.I. Units</li><li>- Do not draw labled diagram properly.</li><li>- Do not write answers separately.</li><li>- Do not write relevant answer to the questions.</li><li>- Do not write Question Number and set of the question paper.</li></ul>	<ul style="list-style-type: none"><li>- Practise the main diagram in the NCERT Text Book.</li><li>- Lable the diagram properly as required in the question.</li><li>- Diagram should be neat, clean and symmetrical.</li><li>- Questions should be attempted as a whole.</li></ul>

## **TOPICS TO EMPHASISED**

### **(EASY AND SCORING)**

- 1) Universe
- 2) Our environment
- 3) Life-Processes
- 4) Metals - Non-Metals
- 5) Carbon Compounds
- 6) Optical Instruments
- 7) Sources of Energy
- 8) Rate of Chemical Reaction
- 9) Magnetic Effect of Electric Current



## **SUGGESTIONS**

- 1) Students should read the question paper attentively and patiently.
- 2) Attempt those questions first which are high scoring & well prepared.
- 3) Try to finish the paper about 5-8 minutes before time to revise the Answer sheet and to minimise the mistakes done.
- 4) Success cannot be measured by height. Students have to work hard to achieve success. They need to acknowledge their weakness, value their strengths and exert themselves to achieve. Think of success and ways to achieve their goals. Expect to reach their goals and they will find them within their reach.
- 5) Responsibility for improvement lies on the Science Teachers.

***Wow !!***

***Getting 80% marks in science is***

***not a difficult task.***



## NOTES







